

WHAT IS CLAIMED IS:

- 1 1. A method of assessing image quality, comprising:
2 detecting a target object region in an input image;
3 generating an image quality feature vector representing the target object
4 region in an image quality feature space; and
5 mapping the image quality feature vector to a measure of image quality.
- 1 2. The method of claim 1, wherein the target object region corresponds
2 to a human face.
- 1 3. The method of claim 1, wherein the target object region corresponds
2 to an object relevant to a person's subjective assessment of image quality.
- 1 4. The method of claim 1, wherein the target object region is detected
2 based on a sub-sampled version of the input image.
- 1 5. The method of claim 4, wherein the image quality feature vector is
2 generated based on a version of the target object region at a resolution of the
3 input image.
- 1 6. The method of claim 1, wherein the target object region is detected
2 based on a first set of features of the input image and the image quality feature
3 vector is generated based on a second set of features of the input image different
4 from the first set of features.
- 1 7. The method of claim 6, wherein the first set of features is
2 substantially decoupled from the second set of features.
- 1 8. The method of claim 1, wherein the image quality feature space is
2 spanned by multiple features including at least one brightness feature describing a
3 respective brightness characteristic of the target object region.
- 1 9. The method of claim 1, wherein the image quality feature space is
2 spanned by multiple features including at least one spectral feature describing a
3 respective spatial frequency characteristic of the target object region.

1 10. The method of claim 9, wherein generating the image quality feature
2 vector comprises decomposing the target object region into multiple wavelet
3 transform sub-bands.

1 11. The method of claim 10, wherein each spectral feature describes
2 energy in a respective wavelet transform sub-band.

1 12. The method of claim 1, wherein the image quality feature space is
2 spanned by multiple features including at least one noise feature describing a
3 respective noise characteristic of the target object region.

1 13. The method of claim 12, wherein a noise feature is computed based
2 on a measure of noise in the target object region.

1 14. The method of claim 12, wherein a noise feature is computed based
2 on a measure of spatial homogeneity of spectral features each describing a
3 respective spatial frequency characteristic of the target image region.

1 15. The method of claim 1, wherein the image quality feature vector is
2 mapped to a measure of image quality in accordance with a machine learning
3 process.

1 16. The method of claim 15, wherein the image quality feature vector is
2 mapped to a measure of image quality in accordance with a radial basis function
3 based machine learning process.

1 17. The method of claim 15, wherein the image quality feature vector is
2 mapped to a measure of image quality in accordance with a mixture of Gaussian
3 based machine learning process.

1 18. A system for assessing image quality, comprising:
2 a target object region detection module operable to detect a target object
3 region in an input image;
4 a feature extraction module operable to generate an image quality feature
5 vector representing the target object region in an image quality feature space; and

6 an image quality assessment module operable to map the image quality
7 feature vector to a measure of image quality.

1 19. The system of claim 18, wherein the target object region
2 corresponds to a human face.

1 20. The system of claim 18, wherein the feature extraction module
2 detects the target object region based on a sub-sampled version of the input
3 image.

1 21. The system of claim 18, wherein the image quality feature space is
2 spanned by multiple features including at least one brightness feature describing a
3 respective brightness characteristic of the target object region.

1 22. The system of claim 18, wherein the image quality feature space is
2 spanned by multiple features including at least one spectral feature describing a
3 respective spatial frequency characteristic of the target object region.

1 23. The system of claim 22, wherein the feature extraction module is
2 operable to generate the image quality feature vector by decomposing the target
3 object region into multiple wavelet transform sub-bands.

1 24. The system of claim 23, wherein each spectral feature describes
2 energy in a respective wavelet transform sub-band.

1 25. The system of claim 18, wherein the image quality feature space is
2 spanned by multiple features including at least one noise feature describing a
3 respective noise characteristic of the target object region.

1 26. The system of claim 25, wherein the feature extraction module
2 computes a noise feature based on a measure of noise in the target object region.

1 27. The system of claim 25, wherein the feature extraction module
2 computes a noise feature based on a measure of spatial homogeneity of spectral
3 features each describing a respective spatial frequency characteristic of the target
4 image region.

1 28. The system of claim 18, wherein the image quality assessment
2 module maps the image quality feature vector to a measure of image quality in
3 accordance with a machine learning process.

1 29. The system of claim 28, wherein the image quality assessment
2 module maps the image quality feature vector to a measure of image quality in
3 accordance with a radial basis function based machine learning process.

1 30. The system of claim 28, wherein the image quality assessment
2 module maps the image quality feature vector to a measure of image quality in
3 accordance with a mixture of Gaussian based machine learning process.

1 31. A system for assessing image quality, comprising: ~
2 means for detecting a target object region in an input image;
3 means for generating an image quality feature vector representing the
4 target object region in an image quality feature space; and
5 means for mapping the image quality feature vector to a measure of image
6 quality.

1 32. A machine-readable medium storing machine-readable instructions ~\n
2 for causing a machine to:
3 detect a target object region in an input image;
4 generate an image quality feature vector representing the target object
5 region in an image quality feature space; and
6 map the image quality feature vector to a measure of image quality.

1 33. A method of generating an image quality assessment engine,
2 comprising: <
3 detecting target object regions in multiple input images;
4 generating image quality feature vectors representing the target object
5 regions in an image quality feature space;
6 correlating the image quality feature vectors with respective measures of
7 image quality assigned to the input images; and
8 computing a mapping between image quality feature vectors and assigned
9 measures of image quality.

1 34. The method of claim 33, wherein the target object region
2 corresponds to a human face.

1 35. The method of claim 33, wherein the image quality feature space is
2 spanned by multiple features including at least one brightness feature describing a
3 respective brightness characteristic of the target object region.

1 36. The method of claim 33, wherein the image quality feature space is
2 spanned by multiple features including at least one spectral feature describing a
3 respective spatial frequency characteristic of the target object region.